

REMARKS/ARGUMENTS

The invention centers on methods, systems, apparatus and computer programs for providing improved resolution and prediction of performance behavior and/or physical characteristic of structural features using feedback information which is provided as a function of position over respective features. The invention is especially important in the improvement and extension of resolution capability for CD-SEM measurements to dimensions below 180 nanometers. Thus, for example, the invention is useful for better determining whether a hole in a resist pattern for forming contacts is truly open thereby improving yield and process condition discrimination.

Kikuchi discloses a process for improved overlay metrology wherein the position of alignment marks are determined and weighted to account for linear and non-linear distortion between respective shots.

Kikuchi does not disclose or suggest use of feedback elements from said features which vary as a function of position over such features as required by the present claims in both the calibration database and in the data provided from the target features. The portions of Kikuchi (page 3, 30-36 and Fig. 7, 8, 10, 11, 14, 15, 18) cited in the office action refer to distortion in the wafer as reflected by the position of the target features. These portions of Kikuchi do not relate to any property of the features themselves which changes as a function of position over the features. Kikuchi is simply concerned with feature position which is then correlated to wafer distortion.

Kikuchi does not disclose the prediction of etchability as in present claims 11, 13, 20, 22, and 33-35. The portions of the specification (page 2-3 sections 0025-0030) cited in the office action are silent regarding etchability, much less


etchability of target features. Kikuchi is concerned with overlay misalignment resulting from wafer distortion. Kikuchi is not concerned whether a pattern can be actually transferred to an underlying layer, but only that whatever pattern one is attempting to transfer is aligned as correctly as possible.

Kikuchi does not disclose or suggest the use of SEM secondary electron emission as required by present claims 15, 24, and 30. Regarding method claims 15 and 24, applicants submit that no where is it contemplated in Kikuchi to use SEM data in the Kikuchi process. Thus, a process claiming to use such SEM data would not be considered obvious from Kikuchi. Regarding apparatus claim 30, applicants submit that apparatus claim requires a scanning electron beam means for obtaining information elements. Nothing in Kikuchi discloses or suggests an apparatus with such means.

Kim (US 6581023) discloses a method of critical dimension measurement using an SEM. The problem addressed by Kim relates to whether individual features are imaged to target critical dimensions in a lithography process on a per layer basis. Kim is not concerned with overlay metrology or overlay alignment which is the subject of Kikuchi. Even if one were to use the measurement techniques of Kim in the method of Kikuchi, the result would be a disregard of any data regarding parameters such as feature depth since Kikuchi is only concerned with the location of target features. Thus, the combination of the teachings of Kim with those of Kikuchi, to the extent such a combination would be motivated to those of ordinary skill in the art, would not result in the claimed invention.

For the above reasons, applicants submit that the claims are patentable over the prior art of record and that the application is in condition for allowance. Such allowance is earnestly and respectfully solicited.

Respectfully submitted,
Eric P. Solecky et al.

By 
Steven Capella, Attorney
Reg. No. 33,086
Telephone: 845-894-3669